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THE WAVE-LENGTH OF THE GREEN NEBULAR LINES N_1 AND N_2.

In order to reduce our 3-prism photographs of the spectra of the more brilliant "bright-line" nebulæ, it was necessary to construct the curve of the relationship between the wave lengths of the lines and the micrometer readings on the lines. We photographed the spark spectrum of titanium and the tube spectra of hydrogen and helium on the same plate, for this purpose. We found at once that there was an error in Runge and Paschen's wave length of the strong helium line in the green, 5015.73 A. Our curves based upon the iron and titanium spectra demanded a wave length of about 5015.85 A for the helium line. Upon examining the literature of the helium spectrum, we noted that the interferometer determinations of the position of the helium line ir question, by Rayleigh and by Eversheim, 5015.856 and 5015.857, respectively, are in good agreement with the indications of our curves. Inasmuch as Wright's determination of the wave lengths of the two green nebular lines near 5007 A (N_1) and 4959 A (N_2)—the determination of greatest weight yet made—was based in part upon Runge and Paschen's erroneous position of the green helium line, we decided to use our efficient equipment in a new determination of the wave lengths of N_1 and N_2.

Our determination is based upon the measures of 19 spectrograms: four of the nebula N. G. C. 6572, five of N. G. C. 7027, and 10 of the *Orion* nebula. The comparison spectra of hydrogen and helium were impressed at frequent and regular intervals upon all of the plates; and on a few of the plates the spark lines of titanium at 4981 and 4991 A were used along with those of hydrogen and helium in fixing the positions of the nebular lines.

We have assumed as the wave-length of the comparison lines the following: for the hydrogen line $H\beta$, W. E. Curtis's value, 4861.51 A; for helium, the mean values of the interferometer measures by Rayleigh and by Eversheim, 5015.86 and 4922.11 A; and for titanium, Kilby's values.

On all of our plates the nebular lines N_1, N_2 and $H\beta$ are recorded. It was assumed that the normal wave-length of the

Hβ line is identical in the nebular and comparison spectra and that the observed displacements of the Hβ nebular line were due to the relative radial velocities of the nebulæ and observer. The measured positions of the nebular lines N_1 and N_2 on each spectrogram were then corrected for the radial velocity indicated by the Hβ nebular line on the same spectrogram. Each plate was measured by Mr. Campbell, Mr. Moore and Miss Hobe. The weighted means of their determinations from the nineteen spectrograms are

N_1	N_2
5007.023 ±.007	4959.080 ±.009 (Rowland system).

In the following table we have collected the results obtained by the modern observers. The values attributed to Wright are from his recent re-reduction of his 1901 observations upon the basis of Rayleigh's and Eversheim's wave-lengths of the helium lines.

Wave-lengths of the Nebular Lines N_1 and N_2.

	N_1	Wt.	N_2	Wt.
Keeler	5007.05 ±.03	1	4959.17 ±.04	¼
Hartmann	7.04	¼	9.17	¼
Wright	6.993±.012	2	9.095±.013	2
Campbell & Moore	7.023±.006	3	9.080±.008	3
Mean	5007.018		4959.094 (Rowland sys.)	

The weights which we have assigned to the results by different observers are those which in our judgment appear to be a fair estimate of their relative merits, after a careful consideration of the methods of observation, and of the number and quality of the individual measures.

We recommend that the above weighted mean values be rounded off to

N_1	N_2
5007.02	4959.09 (Rowland system).
5006.84	4958.91 (International system).

A detailed account of the investigation will appear in *Lick Observatory Bulletin,* No. 279.

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